

Concerning the Aberrant Genus *Nothobius*, with a Redescription of its Type-Species. (Chilopoda: Geophilomorpha: Himantariidae)

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Within the relatively rich himantariid fauna inhabiting California and adjacent areas, there are no more distinctive genera than *Gosothrix* and *Nothobius*. Represented by a single known species each, they alone among all described genera are characterized by the possession of an unguiform pretarsus upon each ultimate leg: no other himantariid genus has an ultimate pretarsus. *Gosothrix insulanus* Chamberlin, the type species, known only from Pond Island in the Gulf of California, is readily distinguished by its lack of major paratergites and of sternital porefields; in *californicus* Cook, the type-species of *Nothobius*, both are present and conspicuous. The present paper will attempt to resolve the long-standing nomenclatural confusion surrounding *californicus* and will present for the first time a sufficiently detailed description of the species with a discussion of variation.

The original proposal of the new genus and species, *Nothobius californicus*, was presented in 1899 by O. F. Cook (p. 303, footnote). Having recognized that Selivanov's 1881 redescription of *Chomatobius mexicanus* (Saussure) was based upon an erroneous identification, he also saw that the Californian specimens which Selivanov had referred to *C. mexicanus*, an oryid, actually represented an unnamed himantariid genus and species. This new form he named and briefly characterized as follows: "This latter [the Selivanov material] evidently represents a different generic type, for which the new name *Nothobius californicus* is proposed. It is distinct from *Chomatobius* in having a row of small suprascutella [major paratergites], in having the ventral pores in rounded areas, the last pleurae [coxopleura] with numerous small pores, and the anal legs with a distinct claw . . . Seliwanoff's [sic] description is contained in the paper entitled 'Geophilidae Mus. Imp. Akademii Nauk,' 1881, p. 24, pl. II, figs. 9-16."

Thereafter the first person to see and then discuss specimens of this remarkable species was R. V. Chamberlin. In 1912 (p. 669) he reported that he had seen Californian material from Stanford, Claremont, and Los Angeles. He presented a short generic and a species diagnosis—which leave no doubt that he was dealing with *Nothobius*—and called the species *Notobius taeniopsis* (Wood).

Notobius is of course a misspelling for *Nothobius*. H. C. Wood's description of *Strigamia taeniopsis* in 1862 (p. 48) is in my opinion inadequate to warrant a generic, much less a specific, identification. We can be sure only that it is a himantariid and that it was collected by LeConte either in Georgia or in California (and probably in the latter), but since no type specimen is known to be extant, it would be most difficult under these circumstances to say to which of the numerous western himantariid genera and species *taeniopsis* is referable. All we know of it is contained in the original description, which is insufficient even for generic assignment. I propose that the name be set aside and that it be considered provisionally as a *species inquirenda* of uncertain generic assignment.

To conclude the historical résumé, in 1929 Attems questioned the inclusion of *Gosothrix* and *Nothobius* in Himantariidae on the grounds that there were probably no true himantariids with ultimate leg pretarsi. He also asserted that the Cook name was a *nomen nudum*. On the contrary, it is a true but aberrant himantariid, and its name is quite valid. Although the name was proposed rather casually in a footnote, the species was characterized, and in addition Cook clearly referred to Selivanov's detailed characterization of 1881 as being descriptive of the new species.

For its era Selivanov's written description is remarkably accurate and full, and apart from the text, his clear and detailed figures make confident identification easy. The distinctive rear legs with their claws and coxopleura, the typical himantariid mandible, the prosternum with its complete sclerotic lines, the conspicuous major and intercalary paratergites, the tiny maxillary lappets, the peculiar labrum—all are very clearly figured,

and in addition many are described in the text. In the text he stated that his description was based upon two females and one male, all from Sacramento, California, under date 1846. The females were 55 and 155 mm. long and had 129 and 132 [*sic*] pairs of legs. The male, 76 mm. long, had 119 pairs of legs.

Most of the specimens upon which the present redescription is based were collected by L. M. Smith and R. O. Schuster in the general area between Lake Tahoe and Sacramento County, that is, on the lower western slopes of the Sierra Nevada Mountains. Subsequently they were given to Mr. R. L. Hoffman who in turn generously presented them to me: all are now in the collection of the U. S. National Museum.

Nothobius californicus Cook

Plesiotype, female: California, Placer County, 4 miles west of Newcastle; L. M. Smith and R. O. Schuster, collectors; April 15, 1958. In U. S. National Museum Myriapod Collection, number 2566.

GENERAL DESCRIPTION. Length, 120 mm. Pedal segments, 153. Color: anterior two-thirds of body nearly uniformly sordid creamy yellow; last third, excluding final 5-10 segments, sordid brown as if discolored. Shape: markedly flattened, ribbon-like; at each end there are 5-10 segments which as a group are slightly attenuate.

ANTENNAE: length (expanded in Hoyer's mountant) 3.7 mm. antennae separated basally. 2nd and 3rd articles very slightly flattened, those remaining round in cross-section. Distally very slightly attenuate. Each article but the first longer than wide. From dorsal aspect becoming densely setose on article 5 or 6. Ultimate article long and conical, inner and outer surfaces each with an elliptical patch of densely packed special sensory setae. CEPHALIC PLATE. Greatest width, 1.5 mm.; greatest length, 1.2 mm.; thus somewhat broader than long. Shape: antero-medially pointed; sides strongly excurved; posterior margin straight, somewhat overlapping basal plate. Prebasal plate concealed. Without a frontal suture or other sulci. Setae sparse, minute. CLYPEUS (fig. 13). Paraclypeal sutures present and

complete but membranous and very vague; transbuccal sutures absent. Clypeal areas and plagulae absent. Posterior clypeal margin darker in color and more strongly sclerotic. Midclypeal setae in a broad, irregular transverse patch; all short and robust. Prelabral setae 6 in number, in a transverse line. Each bucca with a strongly sclerotic anteromesal border. LABRUM (fig. 13). Separated from clypeus by a distinct membranous strip. Medially deeply embayed, the two halves narrowly but distinctly joined; centrally with 4 strong, well-pigmented teeth, these flanked by paler, weaker and more sharply pointed teeth; total dentition 6 + 4 or 5. MANDIBLE. Dentate lamella strong, with curved blunt teeth, 9 right, 7 left, on each mandible the two dorsal-most paler and weaker; right with 8, left with 5 pectinate lamellae, each in addition with 1-2 rudimentary lamellae; the combteeth not expanding basally, apically blunt and apparently truncate or essentially so. FIRST MAXILLAE (fig. 4). Coxosternum weakly and indistinctly divided by a narrow midlongitudinal cleft; lappets absent. Telopodite articles very weakly separated; lappets rudimentary and concealed, apparently absent at lower magnifications. SECOND MAXILLAE (fig. 4). Coxosternum anteromedially deeply incised; postmaxillary sclerites present, well-sclerotized, small, typically elongate. Telopodite claw robust, with 2 stout basal spurs; distal two-thirds spoon-shaped and excavate, the dorsal and ventral edges not pectinate. PROSTERNUM (fig. 1). Sclerotic lines heavy, reaching condyles. Setae very sparse, minute.* PREHENSOR (fig. 1). Distomesal denticles entirely absent. Ungula long and robust, its somewhat flattened surface directed anterodorsally; when closed, the claws not surpassing front of head. Poison calyx tubular, very long; digitiform appendices clustered and numerous. Poison gland extending out of prehensor into prosternal segment; exact terminus of lower end unknown.

TERGITES. Without paramedian sulci, other grooves or depressions. Very sparsely, finely setose. Texture very finely

* Selivanov's figure of the prosternum shows a pair of anterior prosternal denticles which are probably artifacts. In each of my specimens there is a pair of subsurface dark areas in the anterior prosternal diastema. Under low power these could be misinterpreted as denticles.

granulate. PLEURITES (fig. 6). With prominent major paratergites visible approximately from the 55th through the 130th pedal segment. Primary and secondary intercalary paratergites present on nearly all segments. All spiracles essentially or perfectly round. Last right and left stigmopleurites completely fused with their tergite; all others free. LEGS (figs. 10, 11). Sparsely clothed with minute setae. Pretarsal major claws of rear fourth of body notably longer and broader than those of the more anterior legs; pretarsal accessory claws small, at most about a third as long as the major claw. STERNITES (figs. 2, 3). Each much broader than long and very sparsely clothed with tiny setae. Porefields: present on sternites 2 through the penult without interruption, each deeply yellow and pierced with numerous minute pores; on anterior body third transversely elliptical to reniform in shape, thereafter becoming smaller (relative to the sternite) and wider. Beginning on about sternite 45 and continuing through approximately the 75th there is a distinct, wide parasternal cleft between the lateral sternite margins and the adjacent subcoxal pleurites.

ULTIMATE PEDAL SEGMENT (figs. 5, 9). Pretergite fused with its pleurites, without lateral sutures. Tergite transversely rectangular, much broader than long, the sides diverging slightly posteriorly, the rear margin straight. Presternite broad, laterally bending under the anterolateral corners of the sternite; medially diastemate. Sternite much broader than greatest length; midlongitudinally with a shallow, short sulcus; sides very slightly incurved, posteriorly convergent; posterior margin deeply embayed. Coxopleuron: extending anteriorly well forward of rear margin of its segment; very sparsely setose; ventrally with two groups of clustered and cryptic pores which are contained in two concealed cavities; dorsally the majority of the pores are concealed in a hidden trench extending in a sinuous course into the penult pedal segment. Leg: not inflated; tarsus consisting of two articles and armed with a prominent, curved unguiform pretarsus; setae sparse and small. POST-PEDAL SEGMENTS (fig. 9). Female gonopods distinctly biarticulate, the terminal article small and knob-like, the basal articles fused with each other. Terminal pores absent.

Plesiotype, male: California, Sacramento County, Folsom Lake State Park, Horseshoe Bar Area; L. M. Smith and R. O. Schuster, collectors; April 15, 1958. In U. S. National Museum Myriapod Collection, number 2566.

The male agrees closely with the female, differing in the following important variant characters. (See figs. 7, 8, 12.) Length, 73 mm. Pedal segments, 169. Color, uniformly sordid creamy yellow. Labrum: only the two central teeth darker and strongly-developed; total dentition 5 + 5. First maxillary telopodite lappets, present on left, absent on right. Mandibles: left with 6 dentate lamellar teeth and with 6 pectinate lamellae; right with 8 dentate lamellar teeth and with 6 pectinate lamellae. Gonopods long, distinctly biarticulate, widely separated.

In the underlying chart are listed all of the specimens comprising this study, and following the chart a number of variant characters are discussed. Finally, drawing upon all of this information I present a tentative generic characterization and a synthetic description of the the type-species.

| | Sex | Length | Legpairs | 1st maxillary lappets | Last stigmopleurite |
|----|-----|---------|----------|-----------------------|---------------------|
| A | ♀ | 110 mm. | 163 | O-O | F-F |
| B | ♀ | 134 mm. | 161 | O-O | F-F |
| C* | ♀ | 120 mm. | 153 | R-R | F-F |
| D | ♀ | 61 mm. | 161 | O-O | F-F |
| E | ♂ | 50 mm. | 153 | P-P | F-F |
| F | ♀ | 58 mm. | 163 | R-R | F-F |
| G | ♀ | 52 mm. | 165 | P-P | F-F |
| H* | ♂ | 73 mm. | 169 | P-O | F-F |
| I | ♀ | 49 mm. | 143 | P-P | F-D |
| J | ♀ | 83 mm. | 135 | P-P | F-F |
| K | ♂ | 52 mm. | 153 | R-O | F-F |
| L | ♂ | 80 mm. | 127 | P-P | D-D |
| M | ♀ | 91 mm. | 127 | O-O | F-F |

CHART LEGEND. Under 1st maxillary lappets (of telopodites). O = absent entirely; P = present and approximately as shown in fig. 7; R = rudimentary, discernible but smaller than shown in above figure; e.g., R-O = left is rudimentary, right is absent.

Under last stigmopleurite: F = stigmopleurite fused with its tergite; D = stigmopleurite distinctly separated from its tergite; e.g., F-D = the left one is fused to, the right discrete from the tergite, or F-F = both are fused with tergite. An asterisk signifies a plesiotype.

LOCALITIES. All localities are in California. A-K, L. M. Smith and R. O. Schuster collectors; L-M, collector unknown. Placer County, 4 miles west of Newcastle: III.12.58, (A); IV.15.58, (B, C, D, F); III.21.58, (E). Sacramento County, Folsom Lake State Park, Horseshoe Bar Area: IV.15.58, (G, H). Amador County, 4 miles north of Ione: IV.25.58, (I). Sutter County, west side of Sutter Buttes: III.12.58, (J). Calaveras County, north of Murphys: III.5.58, (K). Placer County, Placerville: II.18.29, (L, M).

VARIATION

COLOR. Fresh specimens are predominantly sordid creamy yellow either entirely or throughout the segments comprising approximately the anterior two-thirds of the body. When the latter part of the body is dark brownish or grayish, it appears to have been discolored from within, perhaps by bacterial or other deteriorative agents.

PEDAL COUNTS. The chart reveals a rather wide range of pedal count dispersion for each sex: ♀ 39 and ♂ 43, i.e., ♀ 127-165, ♂ 127-169. Although a distinct statistical structure is not apparent from such limited data, they do at least suggest the possibility, first, that each locality may have a characteristic modal class and range; secondly, that there may be an inverse relationship between modal class and geographic elevation. That is, the lower modes may tend to be more typical of higher elevations and vice versa, e.g., Placerville at 1,875' = 127 legpairs, Ione at 285' = 143 legpairs, Folsom Lake State Park at 200' or less = 165-169 legpairs.

Finally, although the pedal count range of the entire sample is quite large, in any one locality it is appreciably smaller. I suggest that the latitude in range has two concurrent explanations. (1) It is in accord with the general rule: the higher the modal class, or the higher the upper range limit, the greater the range. (2) Whatever the nature of the causal factor or factors, range and especially mode are probably ecophenotypic in expression.

ANTENNAL SHAPE. It is difficult to know how and to what degree emersion in alcohol has distorted antennal configuration, if indeed it has done so. In this series the more proximal

articles are either round in cross-section or else very slightly, barely perceptibly flattened. In some specimens the distal segments as a group seem not at all attenuate; in others the degree of attenuation is very slight.

LABRUM. In all but the smallest, hence usually the youngest, specimens there are four good-sized well-pigmented central teeth. In, for instance (K), a male which I judge to be young, there are but two distinct central teeth. In all, the total dentition varies from 3 + 3 to about 7 + 7. In every case the teeth occur only on the embayed margin and, excluding the central teeth, are smaller, sometimes minute, and sharply pointed.

LAPPETS OF FIRST MAXILLARY TELOPODITES. Lappets were found to be (a) totally absent or (b) present but small (as in

EXPLANATION OF FIGURES

Figs. 7, 8, and 12, male plesiotype; all others, female plesiotype.

FIG. 1. Right prehensor and prosternum. Ventral; setae deleted. Poison calyx and its gland shown in dashed outline.

FIG. 2. 45th sternite and right pro- and metacoxae. Setae deleted. Parasternal fossa shown in cross-hatch. Subreniform ventral porefield shown in solid outline.

FIG. 3. 10th sternite and right pro- and metacoxae. Setae deleted. Reniform ventral porefield shown in solid outline.

FIG. 4. 1st and 2nd maxillae. Left side; all setae shown. Membranous areas stippled. a = weakly sclerotized part of coxosternum. b = more strongly sclerotized part of coxosternum. c = tiny postmaxillary sclerite.

FIG. 5. Rear end of body. Dorsal; all setae deleted. a = tergum of postpedal segments. b = ultimate pedal tergite. c = ultimate pedal pretergite. d = penultimate pedal tergite. e = laterally lying spiracle shown in dashed outline, its stigmopleurite fused with penultimate pedal tergite. f = concealed porigerous trench or fossa shown in horizontal dashes. g = partly exposed rear portion of porigerous fossa.

FIG. 6. Right pleural area of 10th segment. Setae deleted. a = stigmopleurite. b = major tergite. c = major paratergite. d = pretergite. e = intercalary paratergites. f = intercalary pleurite.

FIG. 7. 1st maxillary left medial lobe and telopodite (male plesiotype). Arrow indicates telopodite lappet.

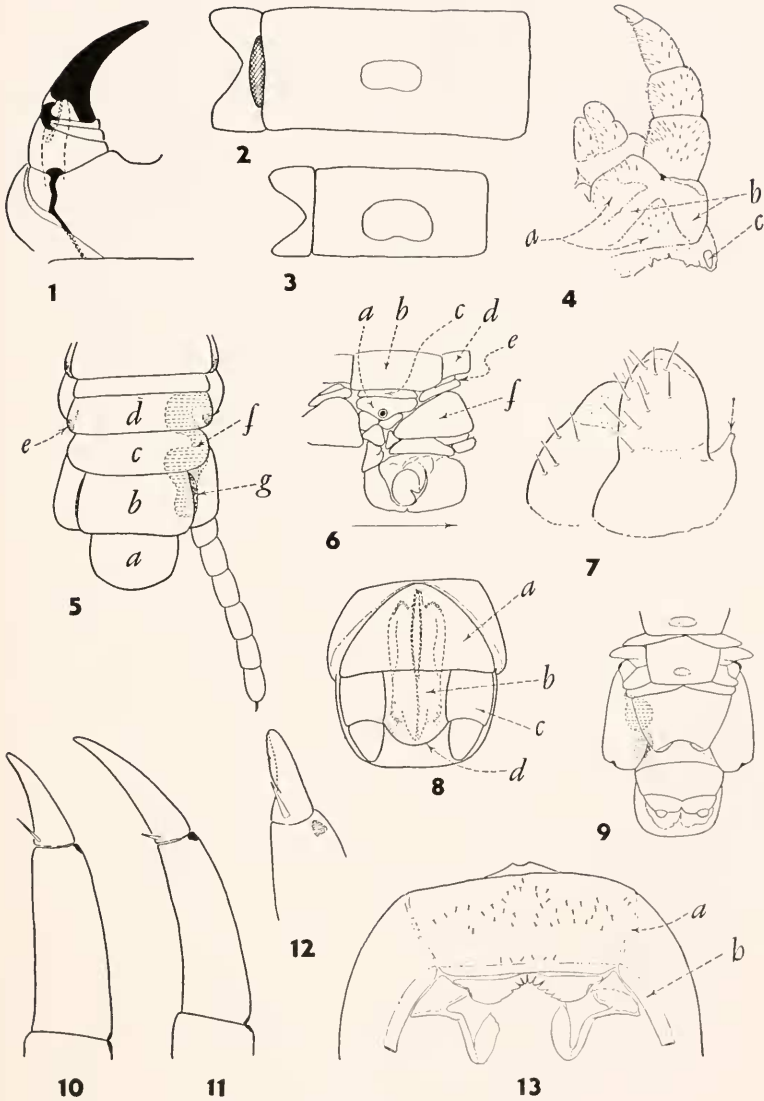
FIG. 8. Postpedal segments (male plesiotype). Ventral; setae deleted. a = 5th sternite. b = in dashed outline, the male intromittent apparatus, or aedoeagus. c = left gonopod. d = rear margin of "penis sac."

FIG. 10. Tarsus and pretarsus of 3rd leg. Lateral; setae deleted.

FIG. 11. Tarsus and pretarsus of penult leg. Lateral; setae deleted.

FIG. 12. 2nd maxillary terminal claw (male plesiotype). Ventral; setae deleted.

FIG. 13. Clypeus, buccae, and labrum with labral fulturae. Ventral; all setae shown. a = left paraclypeal suture. b = strongly sclerotized inner border of left bucca.



FIGS. 1-13.

my figure and in that of Selivanov) or (c) present and rudimentary. Their variant condition is believed to be a reflection only of individual variability. The chart will show that the character is apparently not a function of sexual dimorphism, of ecophenotypy, or of a species difference. That it is highly variable is particularly suggested by specimens (H) and (K).

MAJOR PARATERGITES. The anterior limit of their series is evidently not dependent upon body length or pedal count, for in all specimens the major paratergites are first visible on some pedal segment between the 50th and 60th; in no specimen are they visible anterior to approximately the 50th.

PARASTERNITAL CLEFTS. These clefts occur as a consecutive series of about 10 to 25 on the more anterior part of the body, beginning approximately between pedal segments 35 and 60. The clefts in the middle of each series are quite distinctive, being rounded at each end and quite wide in the middle. The more anterior and posterior clefts of each series are less distinctive, so that judging precisely where the series limits are is often quite difficult and even subjective to some extent.

LAST STIGMOPLEURITE. The chart shows that in nearly all of the specimens the last stigmopleurite of each side is completely fused with the tergite, but also that in one specimen (L) both final stigmopleurites are entirely free of their tergite. Since in some geophilomorphs such a difference would indicate an interspecific or even intergeneric difference, by extension specimen (L) might justifiably be suspected of representing a different species. This, however, is weakened by two factors. First, specimen (I) has one fused and one discrete stigmopleurite. Secondly, in all other respects specimen (L) agrees very closely with the other specimens of the series.

COXOPLEURAL PORES. In most of the specimens the pores are entirely or very largely concealed by the sternite and various dorsal plates, but in a few one or more of the pits and fossae are expanded to expose many or all of the generally cryptic pores. This is apparently no more than individual variability, for it is common to find pores exposed on one side but not on the other.

NOTHOBIUS Cook

SUMMARY OF DIAGNOSTIC FEATURES. Antennae basally very slightly or not at all flattened; distally slightly or not at all attenuate. Labrum deeply embayed. First maxillae: coxosternum medially nearly divided into two halves; telopodite lappets present or absent. Second maxillae: isthmus deeply incised but not divided or sutured; telopodite claw spoon-shaped, edges not pectinate; basal spurs present. Tergites not sulcate; penult tergite fused with or separated from its stigmopleurites. Major paratergites present on approximately the rear two-thirds of the body; intercalary paratergites present on most segments. Sternites: porefields present, undivided, their series unbroken. Ultimate pedal segment: coxopleural pores normally concealed in ventral and dorsal pits or grooves, never freely dispersed over lateral coxopleuron; ultimate leg with two tarsal articles and an unguiform pretarsus. Postpedal segments: male and female gonopods biarticulate; terminal pores absent.

Type species: *Nothobius californicus* Cook, 1899. (Monotypic and original designation.)

Nothobius californicus Cook, 1899

? *Strigamia taeniopsis* Wood, Journ. Acad. Nat. Sci. Phila., (2)5, p. 48, (1862). [*Species inquirenda.*]

Chomatobius mexicanus [sensu Selivanov nec Saussure], Imp. Akad. Nauk, St. Petersburg, 40(7), p. 24, (1881).

Nothobius californicus Cook, Proc. Ent. Soc. Wash., 4, p. 303, (1889).

? *Haplophilus taeniopsis* (Wood),—Chamberlin, Ann. Ent. Soc. Amer., 2(3), p. 177, (1909).

Notobius taeniopsis (Wood),—Chamberlin, Pomona Journ. Ent., 4(1), p. 669, (1912). [*Lapsus calami pro Nothobius.*]

Nothobius californicus Cook,—Attems, Das Tierreich, Lief. 52, p. 55, (1929). [*As genus incertum and nomen nudum.*]

The following *composite characterization* is based upon the original description, upon the Chamberlin description of 1912, and upon the Smith and Schuster specimens. Characters described in the preceding generic summary are not repeated

unless they are believed to have possible intrageneric significance.

Length: ♂ to 80 mm., ♀ to 155 mm. Legpairs: ♂ 119-169, ♀ 127-165. Antennae: weakly or not flattened proximally; no articles but the first wider than long. Cephalic plate: anteriorly rostrate and laterally excurved; wider than long; without sulci or frontal suture. Clypeus: paraclypeal sutures weak and complete; without clypeal area or plagulae; posterior margin strongly sclerotized and pigmented. Labrum deeply embayed and nearly divided; central four teeth normally largest and darkest. Mandible: dentate lamella with 7-9 strong teeth; with 5-9 pectinate lamellae. First maxillae: without setae or lappets on coxosternum; telopodite indistinctly biarticulate, lappets absent, present, or rudimentary. Second maxillae: postmaxillary sclerites elongate, small, well-separated from coxosternum; telopodite claw distally spoon-shaped, its edges not pectinate or serrulate,* with two basal spurs. Prosternum: with heavy sclerotic lines reaching condyles. Prehensors: when closed, not reaching beyond front of head; articles without denticles; poison gland passing into prosternal segment. Pleurites: major paratergites present and beginning anteriorly on segments 40-60, thereafter continuing nearly to the end of the body; spiracles all circular; stigmopleurites through the next-to-last all discrete, the last usually fused with but occasionally separated from the tergite. Legs: pretarsal accessory claws not exceeding $\frac{1}{3}$ to $\frac{1}{2}$ the length of the major claw; rear pretarsal major claws extraordinarily long and broad. Sternites: porefields on sternite 2 through the penult in an unbroken series, each porefield undivided and transversely subelliptical to reniform; certain sternites flanked by parasternal clefts, these appearing on some segments between about the 35th and the 60th; each sternite wider than long; typical sulci absent. Ultimater pedal segment: pretergite fused with pleurites, not laterosuturate. Tergite transversely rectangular, much wider than long, rear margin

* Selivanov's figure of the maxillary claw shows a prominently dissected edge, but this is almost surely an artifact. At low magnification sclerotic thickened ridges can give this impression, and in some specimens it is apparent that the claw edge has been chipped and worn with age.

truncate; sternite much broader than long, sides convergent, rear margin deeply embayed, ventral surface shallowly sulcate; each coxopleuron extending far forward of its body segment, ventrally with two groups of clustered pores which open into two cavities that are wholly or largely concealed, dorsally with a sinuous trench of largely or entirely hidden and clustered pores, the trench extending well forward of the ultimate pedal segment. Postpedal segments: male and female gonopods bi-articulate.

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Heleocoris faradjensis, a New Species from the Belgian Congo (Hemiptera: Naucoridae)

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Subfamily LACCOCORINAE (Stål) 1876

Genus *Heleocoris* Stål 1876

(type *obliquata* (Spin.) 1837)

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